What is claimed is:

1. A method for measuring an optical pulse comprising:
   (a) filtering an optical pulse to obtain a frequency-filtered pulse, a transfer function for said frequency filtering being given;
   (b) measuring a sonogram , which is defined as the intensity waveform of said frequency-filtered pulse, to obtain a measured sonogram; and
   (c) reconstructing said optical pulse by using said measured sonogram and said transfer function.
2. The method as claimed in claim 1, said method including an optical pulse to be measured and a sampling pulse for cross-correlation with said optical pulse.
3. The method as claimed in claim 2, wherein the pulse width of said sampling pulse is much shorter than the pulse width of said optical pulse.
4. The method as claimed in claim 1, wherein the optical pulse is reconstructed by a predetermined formula, and said formula is given by the following:

$$s(t)=\frac{1}{2\pi s^*(0)}\int\frac{M(\theta,t)}{A_h(-\theta,t)}\exp(-j\theta t/2)d\theta$$

where $s(t)$ is the complex amplitude of said pulse, $M(\theta, t)$ is the characteristic function of the sonogram, and $A_h(-\theta, t)$ is the ambiguity function derived from the transfer function of the filter.

5. The method as claimed in claim 4, wherein said formula is derived form the following equations:

$$M(\theta,\tau)=\int\int G(\omega,t)\exp(j\theta t+j\tau\omega)dtd\omega \qquad ;$$

$$h(t)=\frac{1}{\sqrt{2\pi}}\int H(\omega)\exp(j\omega t)d\omega \qquad ;\text{ and}$$

$$Ah(\theta,\tau)=\int h^*\left(t-\frac{1}{2}\tau\right)h\left(t+\frac{1}{2}\tau\right)\exp(j\theta t)dt$$

where $M(\theta, \tau)$ is the characteristic function of the sonogram $G(\theta, t)$, $h(t)$ is the inverse Fourier transform of the transfer function of the filter $H(\omega)$, and $A_h(\theta, \tau)$ is the ambiguity function of $h(t)$.

6. The method as claimed in claim 4, said method including an optical pulse to be measured and a sampling pulse, which is same as said optical pulse, for cross-correlation with said optical pulse; and

   said method further comprising the steps of:

   (a) reconstructing the optical pulse using said formula to obtain a reconstructed pulse;

   (b) modifying said characteristic function of the sonogram by using said reconstructed pulse; and

   (c) repeating said reconstructing and modifying until a converged pulse is obtained.

7. An optical sampling system employing the method as claimed in claim 1.

8. The optical sampling system as claimed in claim 7, said system comprising:

   (a) a first path for optical pulse under test, said first path having a bandpass filter, said optical pulse under test being frequency-filtered by said bandpass filter to produce a frequency-filtered pulse;

   (b) a second path for sampling pulse, said second path having a pulse compressor and a time delay, said sampling pulse being obtained by compressing said optical pulse under test; and

   (c) a cross-correlator for said frequency-filtered pulse and said sampling pulse.

9. The optical sampling system as claimed in claim 7, said system comprising:

   (a) a first path having a device under test (DUT) and a bandpass filter, a sampling pulse being incident on said DUT, said incident optical pulse being frequency-filtered by said bandpass filter to produce a frequency-filtered pulse;

   (b) a second path for sampling pulse, said second path having a time delay; and

   (c) a cross-correlator for said frequency-filtered pulse and said sampling pulse.

10. The optical sampling system as claimed in claim 9, wherein the impulse response of said DUT is characterized from the sonogram.

11. The optical sampling system as claimed in claim 10, wherein said DUT is an optical bandpass filter.